

PHILCO Service Manual . . . Model 660

SERVICE BULLETIN
No. 223



Special Data for Members
RADIO MANUFACTURERS SERVICE
A PHILCO SERVICE PLAN

General Specifications

Type Circuit: Superheterodyne, with push-pull pentodes connected as triodes in output; output 10 watts; built in connections for Philco All-wave aerial; aerial selector built into and operated by wave-band switch.

Power Supply: Alternating Current. Voltage and frequency as specified on chassis nameplate.

Tubes Used: Ten (10) Total: 1 type 78 R.F., 1 type 77 1st detector, 1 type 76 oscillator, 2 type 78 I.F., 1 type 75 2nd detector 1st audio, 1 type 42 driver, 2 type 42 output, 1 type 80 rectifier.

Wave Bands: Four—(1) Shortwave; (2) Police and amateur; (3) Standard Broadcast; (4) Longwave (weather forecasts).

Frequency Ranges: Band (1)—5.7-18.0 Megacycles; Band (2)—1.75-5.8 Megacycles; Band (3)—540 to 1750 K.C.; Band (4)—150-390 K.C.

Program Control: 4 positions: (1) Mellow, (2) Brilliant, (3) Normal, (4) Noise reducing. Last two positions recommended for foreign short wave stations.

Tuning Meter: Shadow type tuning meter, mounted directly above scale.

Waveband Indicator: Glowing arrow on tuning scale shifts to proper scale when waveband switch is turned.

Automatic Volume Control: Fully effective on all stations.

Bass Compensation: Automatic: Effective on first two positions of program control, with volume control turned down.

Tuning Drive: Dual planetary, ball bearing. 80 to 1 ratio for slow-speed tuning, 10 to 1 on main knob.

Intermediate Frequency: 460 K.C.

Power Consumption: 90 watts.

Speaker: Type H-13.

Tube Socket and Power Transformer Voltages Line Voltage 115

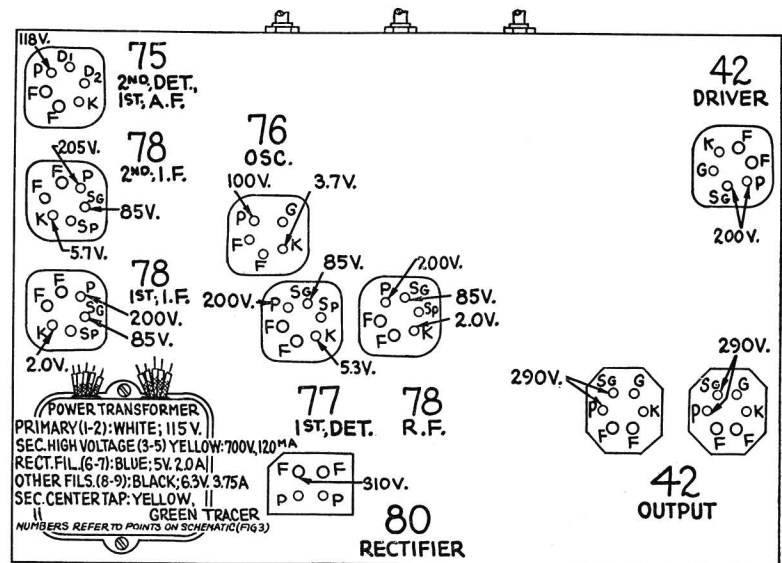


Fig. 1. Sockets as Viewed from Bottom

Socket voltages (measured to ground) obtained at points indicated by arrows. Above voltages were obtained by using a PHILCO type 025 Circuit Tester (or 048A All-purpose Tester), using test prods applied to sockets on underside of chassis. Volume control at minimum; dial at 60; waveband switch at standard broadcast (2d position from left). H-13 Speaker used.

ADJUSTING COMPENSATING CONDENSERS

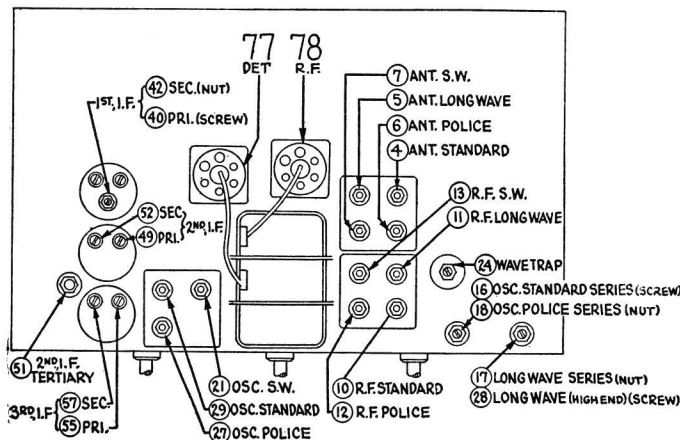


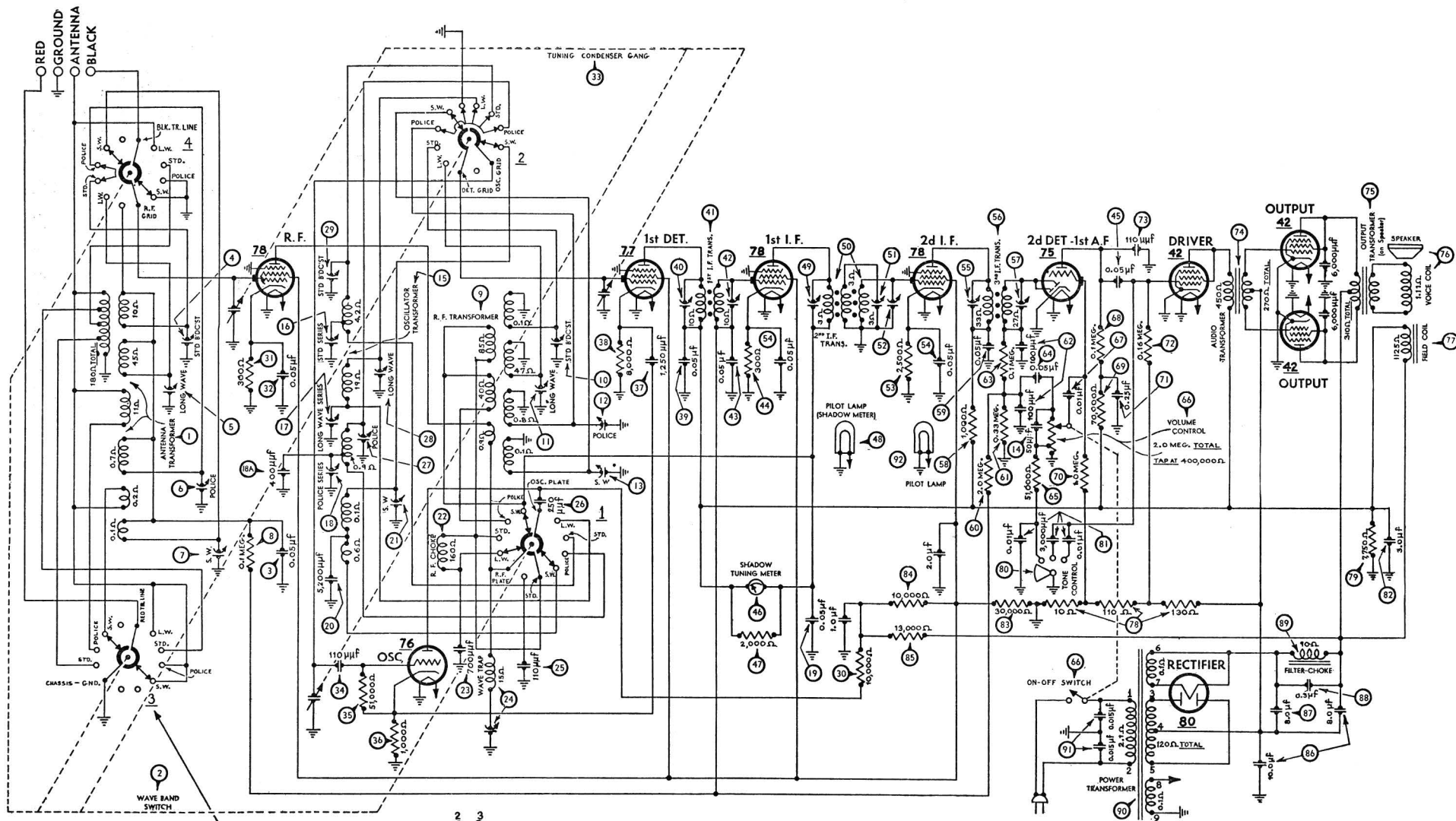
Fig. 2. Location of Compensating Condensers

Adjustment of compensating condensers in Model 660 requires an accurate signal generator covering long-wave, standard wave, police, and short-wave frequencies. The PHILCO Model 088 All-Wave Signal Generator, having a continuous range of from 100 to 20,000 K.C. (all fundamental frequencies) will be ideal for this purpose.

An output meter is also needed. PHILCO Model 025 Circuit Tester includes a high-grade output meter.

Philco No. 3164 fibre wrench and No. 27-7059 fibre handled screwdriver complete the equipment needed for making these adjustments. The locations of the various compensating condensers are shown in Fig. 2. Connect the output meter to the plate contacts of the output tubes (using the adapters provided with the "025") and set it at the 0-30 volt range.

I.F.—Set the Signal Generator at 460 K.C., and attach its antenna lead to the grid cap of the 77 1st detector tube (having removed the grid clip from the tube). Connect the ground

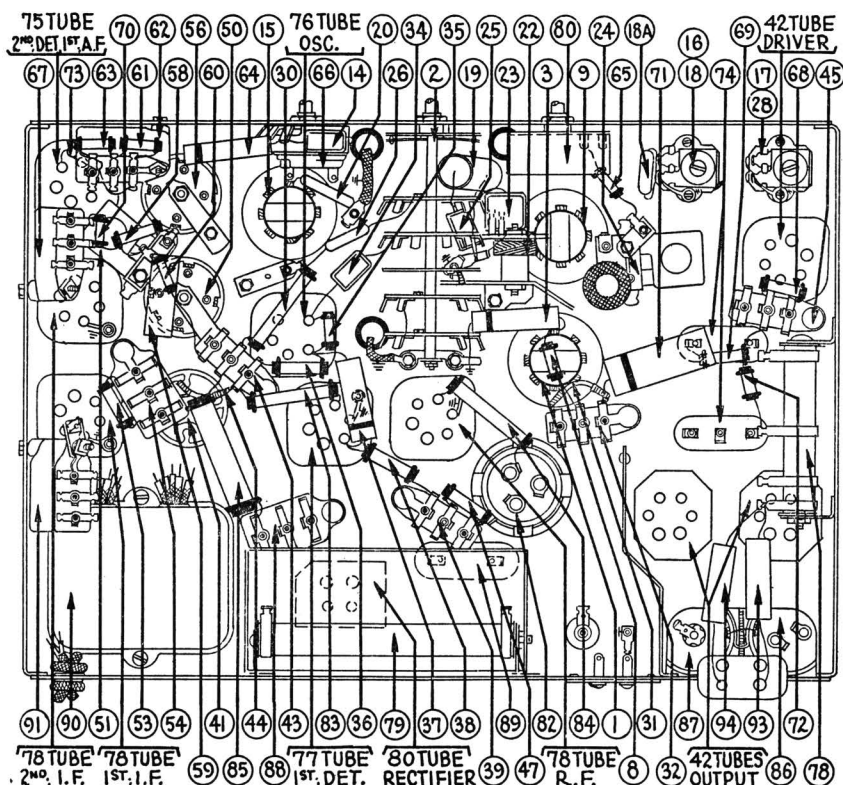


Numbers Indicate Relating Positions of Switch Sections as seen from Front of Chassis.

2 3
10 0-04
All Switch Sections Shown in Position No. 4.

I. F. — 460 K. C.

Figure 3 — Schematic Diagram — Model 660



REPLACEMENT PARTS—MODEL 660

① Antenna Transformer.....	32-1750	\$3.25	⑥⑨ Condenser (.05 Mfd. Tubular).....	30-4123	\$0.35
② Waveband Switch.....	42-1120	2.50	⑥⑨ Resistor (2 Megs.) (Red, Black, Green).....	33-1025	.20
③ Condenser (.05 Mfd. Tubular).....	30-4020	.35	⑥⑨ Resistor (330000 ohms) (Orange, Orange, Yellow).....	33-1200	.20
④ Compensating Condenser (Ant. Standard).....	Part of ①	.....	⑥⑨ Condenser (.00011 Mfd. Twin Bakelite Block).....	8035-DG	.25
⑤ Compensating Condenser (Ant. Longwave).....	Part of ①	.....	⑥⑨ Resistor (.1 Meg.) (White, White, Yellow).....	609H	.20
⑥ Compensating Condenser (Ant. Police).....	Part of ①	.....	⑥⑨ Condenser (.05 Mfd. Tubular).....	30-4020	.35
⑦ Compensating Condenser (Ant. Shortwave).....	Part of ①	.....	⑥⑨ Resistor (50000 ohms) (Green, Brown, Orange).....	609R	.20
⑧ Resistor (.1 Meg.) (White, White, Orange).....	4411	.20	⑥⑨ Volume Control & On-Off Switch.....	3903-S1	1.45
⑨ R. F. Transformer.....	32-1751	3.00	⑥⑨ Condenser (.01 Mfd. Bakelite Block).....	609J	.20
⑩ Compensating Condenser (R. F. Standard).....	Part of ⑨	.....	⑥⑨ Resistor (.1 Meg.) (White, White, Yellow).....	609K	.20
⑪ Compensating Condenser (R. F. Longwave).....	Part of ⑨	.....	⑥⑨ Resistor (70000 ohms) (Violet, Black, Orange).....	33-1096	.20
⑫ Compensating Condenser (R. F. Police).....	Part of ⑨	.....	⑥⑨ Resistor (.1 Meg.) (Brown, Black, Green).....	33-1096	.20
⑬ Compensating Condenser (R. F. Shortwave).....	Part of ⑨	.....	⑥⑨ Condenser (.25 Mfd. Tubular).....	30-4134	.45
⑭ Condenser (.00005 Mfd. Mica).....	30-1029	.35	⑥⑨ Resistor (160000 ohms) (Brown, Blue, Orange).....	33-1191	.20
⑮ Oscillator Transformer.....	32-1752	2.25	⑥⑨ Condenser (.00011 Mfd. Mica).....	30-1031	.35
⑯ Compensating Condenser (Standard Series).....	Part of 31-6027	.70	⑥⑨ Audio Transformer.....	32-7057	2.75
⑰ Compensating Condenser (Longwave Series).....	Part of 31-6054	.45	⑥⑨ Output Transformer.....	32-7078	1.40
⑱ Condenser (.00041 Mfd. Mica).....	30-1000	.35	⑥⑨ Cone & Voice Coil Assembly (H-13).....	02625	1.20
⑲ Condensating Condenser (Osc. Police Series).....	Part of 31-6027	.70	⑥⑨ Field Coil & Pot Assembly (H-13).....	34-3104	2.70
⑲ Condenser (.05 Mfd. Tubular).....	30-4123	.35	⑥⑨ Resistor (B. C. Wirewound) (10 ohms, 110 ohms, 130 ohms).....	33-3137	.30
⑲ Condenser (.0052 Mfd. Mica).....	30-1058	.35	⑥⑨ Resistor (Wirewound, 7750 ohms).....	33-2020	.35
⑲ Compensating Condenser (Osc. Shortwave).....	Part of ⑲	.....	⑥⑨ Tone Control.....	30-4343	.75
⑲ R. F. Choke.....	32-1745	.65	⑥⑨ Condensers in Tone Control.....	Part of ⑥⑨	.....
⑲ Condenser (.007 Mfd. Mica).....	5863	.35	⑥⑨ Condenser (Electrolytic) (3 Mfd., 2 Mfd., 1 Mfd.).....	30-2122	1.85
⑲ Wave Trap.....	38-6850	1.10	⑥⑨ Resistor (30000 ohms) (Orange, Black, Orange).....	7836	.20
⑲ Condenser (.00011 Mfd. Mica).....	30-1031	.35	⑥⑨ Resistor (10000 ohms) (Brown, Black, Orange).....	3524	.20
⑲ Condenser (.00025 Mfd. Mica).....	30-1032	.35	⑥⑨ Resistor (10000 ohms) (Brown, Black, Orange).....	6450	.40
⑲ Compensating Condenser (Osc. Police).....	Part of ⑲	.....	⑥⑨ Resistor (13000 ohms) (Brown, Orange, Orange).....	30-2045	1.80
⑲ Compensating Condenser (Longwave H. F. End).....	Part of 31-6054	.45	⑥⑨ Condenser (Electrolytic 8 Mfd., 10 Mfd.).....	30-2025	1.35
⑲ Compensating Condenser (Osc. Standard).....	Part of ⑲	.....	⑥⑨ Condenser (Electrolytic 8 Mfd.).....	6287-DG	.40
⑲ Resistor (10000 ohms) (Brown, Black, Orange).....	3524	.20	⑥⑨ Condenser (.3 Mfd. Bakelite Block).....	32-7056	2.20
⑲ Resistor (300 ohms Flexible) (Orange, Black, Black).....	33-3010	.20	⑥⑨ Filter Choke.....	32-7440	6.00
⑲ Condenser (.05 Mfd. Bakelite Block).....	3615-SG	.35	⑥⑨ Power Transformer 115 Volts 60 Cycles.....	32-7441	8.75
⑲ Tuning Condenser Assembly.....	31-1609	5.50	⑥⑨ 115 Volts 25 Cycles.....	32-7442	6.75
⑲ Condenser (.00011 Mfd. Mica).....	30-1031	.35	⑥⑨ 230 Volts 50 Cycles.....	3793-DG	.40
⑲ Resistor (51000 ohms) (Green, Brown, Orange).....	6098	.20	⑥⑨ Pilot Lamp (Dial).....	34-2090	.15
⑲ Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20	⑥⑨ Condenser (.006 Mfd. Tubular).....	30-4125	.25
⑲ Condenser (.00125 Mfd. Tubular).....	30-4336	.25	⑥⑨ Condenser (.006 Mfd. Tubular).....	30-4125	.25
⑲ Resistor (8000 ohms) (Gray, Black, Red).....	5838	.20	⑥⑨ Dial Scale.....	27-5115	.40
⑲ Condenser (.05 Mfd. Bakelite Block).....	3615-SG	.35	⑥⑨ Dial Mask and Hub Assembly.....	38-7129	.10
⑲ Compensating Condenser (1st I. F. Primary).....	Part of ④	.....	⑥⑨ Dial Hub.....	28-2837	.10
⑲ 1st I. F. Transformer.....	*32-1642	2.00	⑥⑨ Dial Spring Clamp.....	27-6042	.10
⑲ Compensating Condenser (1st I. F. Secondary).....	Part of ④	.....	⑥⑨ Socket—4-Prong.....	27-6035	.11
⑲ Condenser (.05 Mfd. Bakelite Block).....	3615-SG	.35	⑥⑨ Socket—5-Prong.....	27-6036	.11
⑲ Resistor (300 ohms Flexible) (Orange, Black, Black).....	33-3010	.20	⑥⑨ Socket—6-Prong.....	27-6033	.08
⑲ Condenser (.05 Mfd. Bakelite Block).....	3615-SU	.35	⑥⑨ Speaker Plug Socket.....	27-4208	.10
⑲ Shadow Tuning Meter.....	*45-2083	2.50	⑥⑨ Knob (Volume, Tone, Waveband).....	27-4206	.12
⑲ Resistor (2000 ohms) (Red, Black, Red).....	6984	.20	⑥⑨ Knob (Station Selector).....	27-4207	.10
⑲ Pilot Lamp (Shadow Tuning Meter).....	Part of ④	.....	⑥⑨ Knob (Slow Speed).....	28-2726	.10
⑲ Compensating Condenser (2nd I. F. Primary).....	Part of 31-6028	.85	⑥⑨ Tube Shield (4 used).....	28-2726	.05
⑲ 2nd I. F. Transformer.....	*32-1734	1.85	⑥⑨ Tube Shield (2 used).....	28-2725	.03
⑲ Compensating Condenser (2nd I. F. Tertiary).....	04000-R	.45	⑥⑨ Tube Shield Base.....	1-0433	.60
⑲ Compensating Condenser (2nd I. F. Secondary).....	Part of 31-6028	.85	⑥⑨ A. C. Cord & Plug.....	28-3165	.40
⑲ Resistor (2500 ohms) (Red, Green, Red).....	7775	.20	⑥⑨ Bezel.....	27-8011	.60
⑲ Condenser (.05 Mfd. Twin Bakelite Block).....	3615-DG	.45	⑥⑨ Chassis Mtg. Bolt.....	W-1496A	1.60 per C
⑲ Compensating Condenser (3rd I. F. Primary).....	Part of 31-6003	.45	⑥⑨ Chassis Mtg. Washer (Rubber).....	27-4201	1.40 per C
⑲ Third I. F. Transformer.....	*32-1189	.65	⑥⑨ Chassis Mtg. Bumper (Rubber).....	27-4200	3.75 per C
⑲ Compensating Condenser (3rd I. F. Secondary).....	Part of 31-6003	.45			
⑲ Resistor (1000 ohms) (Brown, Black, Red).....	5837	.20			

* Code 122: 32-1864

○ Code 122: 45-2086

‡ Code 122: 32-1865

Code 122: 32-1866

Adjusting Compensating Condensers (Continued)

terminal of the Signal Generator to the ground terminal of the set. Turn on the set, turn the waveband switch to standard broadcast (second position from left) and set dial at 60. Turn condenser ⑤ (2nd I.F. tertiary) all the way down before adjusting the other I.F. Compensators. Now with the fibre screwdriver, adjust condensers ⑦ and ⑤ (3rd I.F.), ⑥ and ④ (2nd I.F.), and then ② and ④ (1st I.F.) until maximum reading is obtained in the output meter. Turn down the "attenuator" on the signal generator if the output meter needle goes off the scale. Now adjust condenser ① (2nd I.F. tertiary) for maximum reading.

WAVE TRAP—Connect the Signal Generator antenna lead to the grid cap of the 78 R.F. tube. Replace the grid clip on the 77 tube cap. With the signal generator operating at 460 K.C. and the set controls adjusted as for I.F., adjust wavetrap ② until the **minimum** reading is obtained in the output meter.

SHORTWAVE—Turn wave band switch to the shortwave position (extreme right). Set signal generator at 18 megacycles and dial of set at 18.0 (top scale). Now adjust the oscillator, Antenna, and R.F. shortwave compensators in turn, for maximum reading. These are ②, ③ and ⑦ respectively.

POLICE AND AMATEUR BAND—Turn the waveband switch to position 3 (from left). Set the dial and signal generator at 4.5 megacycles and adjust condensers ⑦, ② and ⑥ respectively for maximum reading.

Set the signal generator at 1800 K.C. and turn the dial to 1.8. Adjust condenser ③ (nut), oscillator police series, to maximum reading.

STANDARD BROADCAST BAND—Turn the waveband switch to position 2 (from left). Set the dial and signal generator at 1500 K.C. and adjust condensers ②, ⑩ and ④ for maximum reading.

Set the dial and signal generator at 600 K.C. and adjust condenser ⑩ (screw), broadcast series, for maximum reading.

LONGWAVE BAND—Turn waveband switch to position 1 (left). Set the dial and signal generator at 340 K.C. and adjust condenser ⑧ (screw) to maximum. Then adjust ① and ⑥ for maximum reading. Finally, set the dial and signal generator at 175 K.C. and adjust condenser ⑦ (nut) for maximum reading. This is the longwave series compensator.

Use these . . .

NEW R.M.S. HANDBILLS



- NEW!
- EFFECTIVE!
- INEXPENSIVE!

to tell your neighbors about you:



Form No. PR-264



Form No. PR-262



Form No. PR-265

ANY OF THE ABOVE
HANDBILLS, 8 1/2" x 11" SIZE, AT ONLY \$2.00 PER 1000
IMPRINTED WITH YOUR NAME AND ADDRESS

(Order by Form Number)

Live-wire handbills, properly distributed, are one of the most effective means you can use to make everyone in your community think of you as the man to call when their radio needs service. Here are five handbills designed by the R.M.S. Sales Promotion Department especially to help increase your business—by telling everyone in the neighborhood you are on the job. Order a Supply . . . Use them at Regular Intervals . . . Watch Your Business Grow!

(Send all orders to your Distributor)

PHILCO—Parts & Service Division